

Determining the Regular Deposit for an Annuity

Recall: In our previous lesson we were introduced to a new formula for calculating the Future Value of an Annuity (FV) with a regular deposit (R) given certain conditions for the annuity.

$$FV = \frac{R \left[(1+i)^n - 1 \right]}{i}$$

Today we want to use this same formula to solve for the regular deposit (R) if we know the Future Value of the annuity that we want to achieve.

Example # 1: Jaime is saving for the down payment on a car. She wants \$3500 in her account 3 years from now. The account pays 6%/a. compounded monthly. What regular deposit must Jaime make at the end of each month?



Example # 2: An account pays 7.5%/a. compounded semi-annually. What regular semi-annual deposit must be made to have \$1800 in the account at the end of 6 years?

$$FV = \frac{R[(1+i)^n - 1]}{i}$$

$$1800 = \frac{R[(1+0.0375)^{12} - 1]}{0.0375}$$

Therefore you would need to make a deposit of \$121.52 every 6 months.

$$FV = \$1800$$

$$R = ?$$

$$i = \frac{0.075}{2} = 0.0375$$

$$n = 6 \times 2 = 12$$

$$FV = \frac{R[(1+i)^n - 1]}{i}$$

$$1800 = \frac{R[(1.0375)^{12} - 1]}{0.0375}$$

$$1800 = R[14.8121155]$$

$$\frac{1800}{14.8121155} = R$$

$$121.52 = R$$

PULL

Example # 3: Amir is 25. He plans to have \$ 1 500 000 in a retirement fund when he retires at the age of 65. Assume that on average, Amir's deposits can earn 9%/a. compounded monthly.

- a) What regular monthly deposit does Amir need to make?
- b) How much does Amir contribute in total to the investment by the time he retires?
- c) How much interest has accumulated over the length of the investment?

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